

Supplementary Materials for

The Supplementary file includes:

Figs. S1 to S2

Tables S1 to S3

Fig. S1. (separate file) Cascading 17mer alpha satellite HOR alignment. Start position 91,779,888 bp and end position 96,415,046 bp in T2T- CHM 13. The number on the left side indicate the initial position of the first monomer in each row of HOR copy.

Fig. S2. (separate file) Willard's type 10mer alpha alpha satellite HOR alignment. Start position 90,807,672 bp and end position 91,480,588 bp in T2T- CHM 13. The number on the left side indicate the initial position of the first monomer in each row of HOR copy.

Table S1. Canonical 17mer consensus sequence.

Monomer type t1

TCAGTAGCTTCTTTGTGTGTGTATTCAACTCACAGAGTTGAACCTTCCTTTAGACAGAGCAG
ATTGGAAACACTCTTTTTGTGGAATTTGCAAGTGGAAAATTCTAGCAGTATGAGGCCAATGGTA
CAAAAGGAAATATCTTCGTATAAAAACTAGACAGTATCATTC

Monomer type t2

TCAGGAACTACTTTGTGATATGTGCATTCAACTCACAGAGTTTAACCTTTCTTTTCATAGATGA
GTTTGGAAACAGTCAGTTTGTAAATTCTGCAACTGGATATTTGGACCTCTTTGAGGCTTTCGTT
GGAAACGGGATTTCTTCACATAATGCTAGACAGAAGAATTC

Monomer type t3

TCAGTGAATTTTTCTGTGTGTGTATTCAACTCACAGGGTTGAACCTTCCTTTAGACAGTG
CAGATTTGAAACACTTGTCTGTGGAATTTGCAAGGGGAGATTTCAAGCACTTTGAGGCCATTGG
TGAAAAGGAAATATCTTCGTATAAAAACTAGACAGAATCATTC

Monomer type t4

TCAGAACTGCTTTGGGATGTGTGCATTGAACTCACAGTGTTTAACACTTCTTTTCATAGAGCA
CTTTGGAAACACTCAGTTTGTAAATGTCTGCAGCTGGATATTTGGACCTCTTTGAGGCCTTCGTA
GTAAACGGGATTTCTTCGTGTAATGATAGACAATAGAATTC

Monomer type t5

TCAGTAACTTCTTTTTGTGGTGTGTATTCAACTCACAGAGTTGAACCTTCCTTTAGACAGAGCA
GATTTGAAACTCTCTTTTTGTGGAATTTGCAAGTGGAGATTTCAAGCGCTTTGAGGCCAACGGC
AGAAAAGGAAATATCTTCGTAGAAAAAATAGACGGAATCATTC

Monomer type t6

TCAGAACTACTTTGTGATGTTTGCGTTCAACTCACAGAGTTTAACGTTTCTTTTCATAGAGCA
GTTTGGAAACACTCTTTTTGCGAATCTGCAAGTGGATATTTGGACCTCTTTGTGGCCTTCGTT
GGAAACGGGATTTTTCATATAATGCTAGACAGAAGAATTC

Monomer type t7

TCAGTAACTTCTTTGGGTTGTGGGTATTCAACTCACAGAGTTGAAGCTTCCTTTAGGCGGAGCA
GATTGGAAACACTTTTTGTGGAATTTTCAGGGGGAGACTTCAAGCGCTTTGAAGTGAATGGTAG
GAAAGGAAATATCTTCGTATAAAAACTAGACGGAGTCATTC

Monomer type t8

TCAGAACTACTTTGGTACGTGTGTGTTCAACTCACAGTGTTTAACCTTTCTTTTCATAGAGCA
GTTTGGAAACACTCAGTTTGTAAAGTCAGCAACTGGATATTTGGATGTATTTGAGGCCTTCGTT
GGAAACGGGATTTCTTCATATAATGCTAGACAGAAGAATTC

Monomer type t9

TCAGTAACTGCTTTTTCTGGTGTGTATTCAACTCTCAGAGTTGAACCTTCCTTTAGAAACAGCA
GATTTGAAACTCTCTTTTTGTGGAATTTGCAAGTGGAGATTTCAAGAGCTTTGAGGCCAATGGTA
GAAAAGGAAATATCTTCGTATGCAAACTAGACAGAATCATTC

Monomer type t10

TCAGAACTGCTTTGCAATGTGTGCGTTCAACTCACAGTGTTTAACCTTTCTTTTCATACAGTT
GTTTCGAAACACTCTTTTTGCGAATCTGCAAGTGGATATTTGGACCTCTTTGAAGTCTTCGTT
GGAAATGGGATTTCTTCATATAATGCTAGACAGAAGACTTC

Monomer type t11

TCAGTGAATTCTTTCTGTGTGTGTATTCAACTCACAGAGTTGAACGTTTCCTTTAGACAGAGT
AGATTGGAAACACTCTTTTTGTGGAATTTTCAGGTGGAGGTATCAAGCGCTTTGAGGCCAATGA
TAGAAAAGGAAATACCTTCGTATAATAATTAGACGGAATCATTC

Monomer type t12

TCAGAACTGAGTTGTGATGTTTGCATTCAACTCACAGAGTTCAACATTCCTTTTAATGGAGCG
GTTTTGAAACACTCTTTTTGCAGAATCTGCAAGTGGATATTTGGACCTCTTTGAGGCCTTCGTT
GGAAACGGGATTTCTTCATGTAATGCCAGACAGAAGAATTC

Monomer type t13

GCAGAAACCACGTTGTGATCTCTGCATTCAACTCACAGAGTTGAACCTTTCTTCCTATAGAGCA
GTTATGAAACAGTCTCTTTGTAGAATTTGCAAGGGTGTATTTAGAGGGCATTGAAGCCTACGGT
AGAAAAGGAAATATCTTACCATAAAATCTAGTCAGAAGCATTC

Monomer type t14

TCAGAACTTCTTGATTGTTATGTGTGCATTCAACTCACAGAGTTGAACCTTACTTTGGAAAGA
GCAGTTTTCTAACACTCTTTTTGTAAAAGTTCCAAGTGAATACTTTGAGTGCTTTGAAGCCTAC
GGTTGACAACGAAATATCTTCATGTAAAACTACAAAGAATCATTC

Monomer type t15

TCAGAACTACTTTGTGATGTGTGCGTTCAACTCACAGAGTTTAACCTTTCTTTTCATAGAGCA
GTTTGAAACACTCTGTTTGTGAAGTCTGCAAGTGGATATTTAAACGTCTTTGAGGCCTTCGTT
GGAAACGGGATTTCTTCATATAAACCAGGACAGAAGAATTC

Monomer type t16

TCAGAACTGCTTTGTGATGTGTGTATTAACTCACAGAGTTGAACATTTCTTTGCATAGAGCA
GTTTGAAAGACTTAGTTTGTGCAGTGTGCAAGTGGATATTTGGAACCTTTGAGGCCTTCGTT
GGAAACGGGATTTCTTCTTATAATTCTTGACAAAAGAATTC

Table S2. Canonical 10mer consensus sequence.

Monomer type t1

TCATAAACTTCTTCGTGATGTGTGCTTTCAACTCGCAGCGTTGAAGCTTCCTTTTCGATAGAGCA
GTTTTGTAACCTCTCTTTTGTAGAATTTCCAAGTGGATATTTAGCGCCGTTTGAGGCCTATGGT
GGAAAAGGCAATATCTTCATAGAAAACTAGACAGAATGATTC

Monomer type t2

TCGGAAACTACTTTGTGATACCTGCCTTCAACTCTCAGAGTTGAATATTCCTCTTGATGGAGCA
GTTTTGAAAACTCTTTTGTGAATCTCCAAGTGGATATTTGGACCTCTTGTGGCCTTCGTT
TGAAACGTGACTGCTTCATACAAAAGTAGACAGAAGAATTC

Monomer type t3

TCTGAAGCTACTTTGTGATGTGCGCATTCACTGACAGAGTTTAACCTTCTTTGGATAGAGCG
GTTTTAAACACTCTTTTGTGGAATTTGCAATCTATATTTAGAGTGCTTTCAGGCCTGTGGTA
CAAAAGGGAATGTCTTCACATAAAATCTAGACAGAAGCATTG

Monomer type t4

TCAGAAACTTCTCTGTGATGTGTGCATTTAACTCTCAGAGTTCAACCTTCCTTTTGATAGAAGA
GTGTTGAAATATTCCTTTTGTAGAATTTCCAAGTGAATATTTAGAGCGGTTTCAGGCCTATGTA
GAAGAGAAAATATCTTCACAGAAAACTAGACATAATTGTTT

Monomer type t5

TCAGAAACTACTTTGTGATGTGTGGGTTCAACTCACTGAGTTTAACCTTCTTTTGATAGACCA
GTTATGAAACACTCTTTTGTAGAATCTGCAAGTAAATATTTGGACTTTTTTGAGGCCTTCATT
GGAAACGGGATTTCTTCATATAAACCTTGACAGAAGAATTC

Monomer type t6

TCAGAAACTTCTTTGTGATGTGTACCTTCAACTCACAGAGTTGAAGCTTCCTTTCAATAGAGCA
CTTTTGAAACTCAGTTTTTGTAGAATTTCCAGGTGGATATTTAGCGCCGTTTGAGGCCTATGGT
AGAAAAGGCAATATCTTCGTAGGAAAACCTAGACAGAATGATTC

Monomer type t7

TCAGAAACTTATTTGTGATATTTGCATTTCAACGCACAGAGTTGAACATTCCTCTTGATGGAGCC
GTTTTGAAACACTCTTTTGTAGAATCTGCAAGTGGATATTTGGACCTCTTGTGGCCTTCGTT
TGAAACGTGATTTCTTCATTTACAACCTAGACAGAAGAATTC

Monomer type t8

TCCGAAGCTGTTTTGTGATGCTTGCATTCAGCTGACAGAGTTTAACTTCCTTTGATAGAGCAG
TTTGGAACACTCTTTTGTGGAATTTGCAAGTGTATATTTAGAGCGTTTTGAGGCCTACAGTA
GGAAAGGAAATATCTTCACATAAAAACCTAGACAGAAGTATTG

Monomer type t9

TCAGAAAATTATTTGTGATATGTGCATTTAACTCATGGAGTTGAAACTTCCTTTTCGATAGAAGA
GTTTTGAAATACTCTTTTGTAGAATTTCCAAGTGGATTTTACAGCGTTTGAGGTCTATGGC
AGAAAAGAAATATCTTCACAGAAAACTAGGCAGATTCATT

Monomer type t10

TCAGAAACTACTTTGTGATGTGTGCCTTCAACTCACAGAGTTTAACCTTCTTTTGATAGAGCA
GTTTTGAAAACTCTTTTGTAGAATCTGCAAGTGTATATTTGGACTTTTCTGAGGCCATCTTT
GGAAACGGGATTTCTTCATATAAAACTTGAAAGAAGAATCC

Table S3. HOR copy composition of 10mer HOR array. CHC, canonical HOR copy; var, variant HOR copy.

No. of HOR Copies	HOR copy
9	CHC
1	var t1-t5
27	CHC
1	var t1-t5
8	CHC
1	var t1-t4, t6- t10
1	CHC
2	var t1-t5
50	CHC
1	var t1-t5
55	CHC
1	var t1, t7-t10
12	CHC
1	var t6-t10
30	CHC
1	var t4-t10
1	var t3, t7-t10
50	CHC
1	var t1-t2, t11
1	var t9-t10
1	CHC
1	var t1-t2, t11
1	var t9-t10
47	CHC
1	var t1-t2, t10
1	var t9-t10
1	var t1-t2, t10
1	var t9-t10
1	var t6-t10
11	CHC
1	var t1-t6
1	var t2-t10
76	CHC
1	var t1-t6

1	var t5-t10
1	var t1-t6
1	var t5-t10
1	var t1-t6
1	var t5-t10
1	var t21-t6
1	var t5-t10
1	CHC
1	var t1-t6
1	var t5
1	var t1-t8
